Status of Resident Attrition From Surgical Residency in the Past, Present, and Future Outlook

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OBJECTIVE: To investigate the current rate of attrition in general surgery residency, assess the risk factors, and identify prevention strategies.

DESIGN: A literature review of the PubMed and MEDLINE databases, from January 1, 1980 to February 1, 2016, for relevant articles. The calculated attrition rate and the statistically significant influencing factors were the main measures and outcomes.

SELECTION: All English language articles that described attrition from a general surgery residency were included. Articles that performed an assessment of attrition rates, academic performance, reasons for resident loss, and demographics were identified and data from these studies were collected. Random-effect meta-analysis and meta-regression based on a generalized mixed-effects model was performed.

RESULTS: A total of 26 studies were included. Reported attrition rates ranged from 2% to 30% over the course of residency training. Random-effect meta-analysis is indicative of a yearly attrition rate of 2.4% (95% CI: 1.3%-3.5%) and a cumulative 5-year attrition rate of 12.9% (95% CI: 7.9%-17.8%). Most of them leave residency during their first 2 years, and the rate significantly decreases with increasing postgraduate year (p < 0.0001). The Accreditation Council for Graduate Medical Education mandated 80-hour week is associated with a higher rate, though not significantly (3.2% [95% CI: 1.3%-5.1%] vs. 2.2% [0.9%-3.5%], p = 0.37). Pooled analysis demonstrates no statistically significant difference in the rate of attrition between males and females (2.1% [95% CI: 1.1%-3%] vs. 2.9% [95% CI: 1.6%-4.1%], p = 0.73). Most remain in graduate medical education and pursue residency training in other specialties.

CONCLUSION: Attrition in general surgery most commonly occurs within the first 2 years of training and, in contrast to previous findings, is not related to female sex. Restrictions on work hours seem to have increased the rate, whereas remediation practices can prevent it. Training programs should direct efforts towards attrition-prevention strategies. (J Surg Ed ∎:∎∎∎-∎∎∎. © 2017 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: graduate medical education, internship and residency, surgical specialties, attrition, risk factors, incidence

COMPETENCIES: Practice-Based Learning and Improvement

INTRODUCTION

The Halsted model of surgical residency, developed at the turn of the 20th century, inherently contained a high rate of trainee attrition.[1-3] This so-called "pyramid model," begun in 1889, was designed to induct into training a larger number of trainees than would ultimately graduate, allowing only a select few to finish training and become independent surgeons.[3,4] Indeed, by 1904, fully 15 years following the institution of this pedagogical model, Halstead had only graduated 17 chief residents.[4] Given the inability of such a system to produce needed graduates, a "rectangular" system was introduced at the Massachusetts General Hospital in the 1930s, a program that admitted a set number of trainees, all of whom were expected to complete the program.[4] Despite this, some version of a

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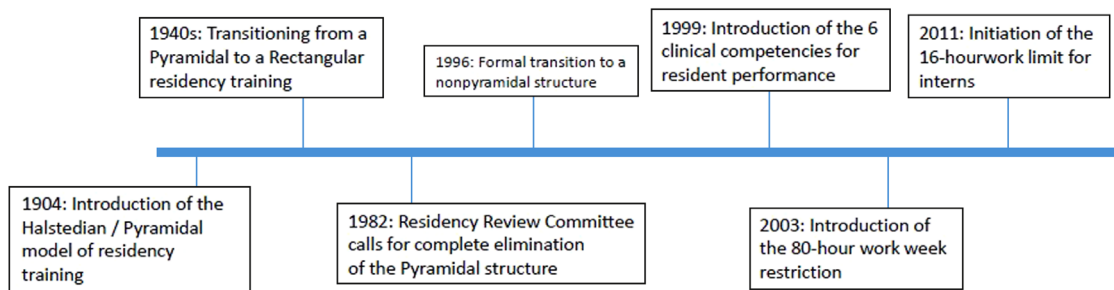
FIGURE 1. A timeline of historical landmark events that have culminated in the development of the structure of surgical residency that it is today.

"pyramidal" system persisted until a call by the Residency Review Committee to end this practice in the early 1980s finally led to the end of this practice by 1996[1] (Fig. 1). Since that time, the landscape of surgical education has changed markedly: work-hours reforms, increasing use of educational science, the expanding role of simulation and certification have all led to large changes in the ways in which surgeons are trained. Notwithstanding work hour reforms and an increased attention to the overall well-being of resident trainees, the rate of attrition in general surgery is often quoted to be as high as 20% cumulatively over the course of training.[5,6]

Beyond the challenges inherent in the education and training of future generations of general surgeons, surgical educators face the potentially daunting task of identifying candidates for training who are likely to succeed in their programs and who are unlikely to drop out.[7] Resident attrition in general surgery poses serious problems at the resident and faculty level, and can affect program morale, staffing, and educational strategies. For instance, leaving residents may have had a history of personal and academic problems influencing the attitudes of colleagues and attendings.[8] On the contrary, having an appreciation of what group is likely to drop out of surgery residency, surgical educators can be selective when choosing candidates. Understanding the challenges that cause such groups to drop out of residency can help educators in supporting residents rather than refuse to select members of those groups. In addition, identifying the factors that may contribute to attrition can create a surgical workforce that can best serve all our patients.

There exists an abundance of literature that attempts to parse the reasons for general surgery resident attrition. Previous authors have focused on selection strategy,[7,9] have reviewed single center experiences to identify trends or predictive attributes,[8,10-14] or have attempted to gather multicenter data regarding reasons for resident attrition.[2,15-25] Even with these previous efforts, consensus is still lacking with regard to the most effective means of reducing resident attrition from general surgery residency programs. The goals of this review are to summarize the best available information regarding surgical resident attrition, identify any risk factors for attrition, and evaluate ways to prevent it.

METHODS

Search Strategy

All studies published in English between January 1, 1980 and February 1, 2016 were screened for inclusion. Studies were not limited with respect to type (survey-based, retrospective review, single center, or multicenter studies). Attrition was defined as the number of residents who left the program each year, including those who left willingly, as decided by the program, and transfers into other programs. Guidelines from the PRISMA statement (preferred reporting items for systematic reviews and meta-analyses) were used for the collection and analysis of data from studies in the literature.

Electronic Databases

Studies were identified using MEDLINE and PubMed. Search terms included "attrition in general surgery residency," "attrition general surgery," and "attrition surgery residency".

Types of Studies

All studies that reviewed general surgery resident attrition, or factors associated with resident attrition (e.g., the desire to quit, the effect of pregnancy and starting a family, and the effect of program selection strategy on future attrition) were included in our analysis. The level of evidence of each study along with the potential confounders and biases were considered.

Participants

Our review is limited to published literature that examines attrition in general surgery residency programs, either by surveying or assessing current surgical residents or by survey of current program directors (PDs) in general surgery programs. Also included in our review are systematic examinations of national publicly held records of current and past surgical trainees as maintained by the American Board of Surgery (ABS) or the Association of American Medical Colleges. Literature pertaining exclusively to